26. A method of creating crawfish meal for livestock having lowered calcium and phosphorous levels comprising the steps of:

a). introducing a crawfish waste meal into a process flow;

b). separating said crawfish waste meal and collecting said crawfish waste meal particles that are equal to or less than 3/16 of an inch in diameter;

c). mixing said separated crawfish waste meal with an acid;

d). adding a liquid to said separated crawfish to create a slurry;

e). determining the pH of the slurry and stirring the slurry;

f). settling the slurry;

g). draining the slurry to create a treated crawfish meal creating an effluent having a pH of 7;

h). rinsing the treated crawfish meal with a liquid;

i). determining the pH of the slurry and stirring the slurry; and

j). drying the treated crawfish meal.

27. The method as recited in claim 26 whereby said acid is hydrochloric acid.

28. The method as recited in claim 26 whereby said step of settling the slurry is within the range of 4-8 hours.

29. The method as recited in claim 26 whereby said rinsing liquid is H_2O.

30. The method as recited in claim 26 whereby said step of determining the pH further comprises addig water until said pH is less than or equal to 2.

REMARKS

In the office action dated January 13, 2003, the examiner objected to the specification pages 1 and 4. The objection on page 1 was in response to referral to disclosure documents. New page 1 has been submitted deleting these references. Additionally, the examiner objected to several misspelled words on page 4. The applicant has submitted new page 4 which corrects the misspelled words. These new pages were submitted merely in response to the examiner's objections and does not include new matter.

Claims 1-9 were rejected under 35 USC section 103 in view of Peniston et al (Peniston). The applicant has canceled claims claims 1-9, and 20 and added new claims 21-30. The applicant claims an simpler more environmentally friendly process for producing livestock feed reducing calcium and phosphorous levels. The effluent from the applicant's process is neutral requiring no additional treatment. The effluent as described in Peniston column 9 lines 10-15 has an effluent ph of 12.4-12.8. This pH reading far exceeds federal and state guidelines for untreated waste. This alone would generate millions of dollars per year in waste treatment costs making this process cost prohibitive. Additionally, Peniston et al requires the use of acids and bases to extract the desired by products. While Peniston mentions the use of hydrochloric acid, it relies heavily on sodium sulfite, sodium hydroxide, nitric acid, potassium hydroxide, sodium proteinate, and sulfuric acid. These chemicals are considered hazardous and costly, increasing the production costs. The applicant's process only uses hydrochloric acid and water to achieve a neutral effluent and a livestock feed having a protein range between 45-65%. In addition, it lowers the calcium to phosphorous ratio to 2:1. On column 9 line 23 Peniston discusses protein levels at range between 6-8%.

Pricing is critical factor in livestock feed. Processes such as Peniston are cost prohibitive to create livestock feed. Additionally, the shell fish waste would have to be shipped to an offsite plant for processing. The process as described in Peniston is not readily adaptable for field use. However, the applicant's process is simple and created for field adaptation at the processing plants, thereby slashing all initial shipping costs. While the process as described in Peniston does disclose some of the steps as claimed by the applicant, it also claims the addition of the more complicated and costly steps of several centrifugation processes (column 10 line 2), wet grinding, and spray drying (column 10 lines 4-8). Finally, Peniston as set out in its objectives to use the shell or chitin to extract its by products. While the applicant's process uses all of the shellfish waste material to create its by product. More specifically, the applicant's process incorporates the use of crawfish waste that until the now was never considered as a commercially viable product or livestock feed.

In view of the foregoing, it is the applicant's belief that new claims 21-30 overcome the objections and rejections as set forth by the examiner and the application is in condition for allowance.

Respectfully submitted,

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Registered Patent Attorney
Re. No. 34,809

Dated: 7/11/03

METHOD AND APPARATUS FOR REDUCING THE CALCIUM AND PHOSPHOROUS RATIO AND INCREASING PROTEIN IN SHELLFISH WASTE MEAL

CROSS REFERENCE TO RELATED APPLICATIONS

"This invention was originally disclosed in provisional application numbers 482942, and 490994 filed on, November 28, 2000 and March 26, 2001 respectively. The inventor claims all rights and priorities associated with that provisional application."

FIELD OF THE INVENTION

This invention relates to a method and apparatus for the processing of shellfish waste meal (SWM). More particularly, to increasing the crude protein while decreasing calcium and phosphorus levels of SWM. The method significantly reduces the percent calcium and phosphorous in shellfish waste meal while lowering the ratio of calcium to phosphorous and raising or maintaining protein levels. These findings make the waste meal a more viable economical protein source in fertilizer and livestock rations.

BACKGROUND OF THE INVENTION

Proper disposal of aquatic waste is a growing environmental problem for the aqua-culture industry in Louisiana and other coastal areas of the United States. Freshwater Crawfish *(Procambarus clarkil)* and the White River Crawfish *(Procambarus zonangulus)* are important commercial commodities in Louisiana. Louisiana produces over 90% of the crawfish harvested in the United States. The state's aquaculture industry has over 100 crawfish shrimp and crab processing plants. These plants bag the shellfish for sale and or extract the tail meat from the millions of pounds processed at the plants. Of the amount of shellfish harvested each year, approximately 85% (34 to 85 million pounds) is classified as crawfish waste. Analogously, of the crab, and

Other features and advantages of the present invention will be apparent from the following description in which the preferred embodiments have been set fourth in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In describing the preferred embodiments of the invention reference will be made the series of figures and drawings briefly described below.

Figure 1 shows schematic of the process flow diagram.

Figure 2 continues the process flow diagram of the method.

Figure 3 shows the process using crawfish waste meal.

Figure 4 continues the process flow diagram of fig. 3.

Figure 5 shows the separator.

There may be additional structures described in the foregoing application which are not depicted on one of the described drawings. In the event such a structure is described but not depicted in a drawing, the absence of such a drawing should not be considered as an omission of such design from the specification.

DETAILED DESCRIPTION OF THE INVENTION

In the following description, the present invention will be described in this embodiment as a process for producing shellfish meal. Those skilled in the art will readily recognize that the equivalent of such process and its applicability for all crustaceans.

Referring to figures 1 and 2 step 1 (100),dried material of SWM is introduced into the process flow. Step 2 (110), the SWM is loaded into a mechanical or electrical feed separator. Step 3 (120), the separator allows small pieces of SWM to fall into a collection pan. The separator has a mesh screen with 3/16 inch openings. The pieces of SWM that are larger than 3/16 inches are sent to a grinder (122) and returned to the separator. Step 4(130), the pieces which are 3/16 inch or less are